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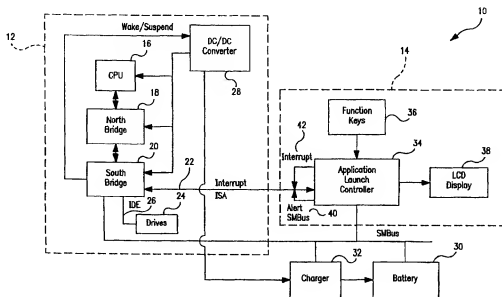
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(54) Title: LAUNCH KEY, LOW POWER CD-ROM PLAYER FOR PORTABLE COMPUTERS

(57) Abstract: A portable computer (12) adapted with an application launch controller (34) to selectively launch a desired application when the portable computer is in an off or suspended state. Programmable function keys (36) are provided to permit users to define associated applications with the function keys to initiate launching of the application. The application launch controller includes bus interface circuitry to interface with system buses, for example, ISA bus (22) and SMBus (24) technology to exchange commands and data therewith. In the preferred embodiments, the application launch controller displays results of the desired application to an LCD display (38) rather than to the main system display to preserve power.

WO 01/15159 A1

1   **LAUNCH KEY, LOW POWER CD-ROM PLAYER**

2   **FOR PORTABLE COMPUTERS**

3   BACKGROUND OF THE INVENTION

4   **1.   Field of the Invention**

5   The present invention relates to a controller for portable computers to launch

6   applications. More specifically, the present invention relates to a portable computer

7   adapted with a controller to launch applications when the main components of the system

8   are in off or suspend mode.

9   **2.   Description of Related Art**

10   In traditional digital computers such as portable lap top or notebook personal

11 computers, the computer needs to be fully operating to monitor/accept the functionality

12 associated with a preprogrammed function key for launching a specific software

13 application. However, continuous power to the system likewise continuously drains

14 battery power, especially in portable computers. Traditionally, applications are launched

15 from within the operating system only when power to the system is on. The present

16 invention provides an alternative mode for powering on the system to launch a specific

17 application, preset by a user.

18   In United States Patent Application Serial No. 09/136,207 entitled "Low Power

19 CD-ROM Player for Portable Computers" filed August 19, 1998, now U.S. Patent No.

20 _____ (herein incorporated by reference), it is disclosed a CD-ROM subsystem

21 for a digital computer. The CD-ROM subsystem includes a CD-ROM drive, CD-ROM

22 control buttons (i.e., function keys) for controlling a CD-ROM drive's operation, and an

23 audio interface controller to permit users to operate the CD-ROM without having to fully

24 power the main components of the computer system. The present invention augments the

25 functionality disclosed in the aforementioned patent application by adding a mode switch

26 enabling users to launch a specific application when the computer is either off or in a

27 suspend state.

SUMMARY OF THE INVENTION

Accordingly, it is a main object of the present invention to adapt laptop and notebook digital computers with an application controller to permit users to activate a computer system and launch an application when the system is in an off or standby state.

The present invention provides a computer system adapted to launch application when the computer system is in an off or suspended state comprising a computer subsystem comprising a system CPU, coupled to a bus bridge integrated circuit for coupling said CPU to a plurality of bus systems, and a power supply. Also included is an application launch controller for launching a selected application when the computer subsystem is in an off or suspended state comprising one or more bus interfaces for exchanging commands and data along one or more of said bus systems and for selectively generating a power on command signal to the power supply to deliver power and turn on the computer subsystem and launch the selected application.

In one embodiment, the power supply comprises a system DC/DC converter coupled to the bus bridge and receives an activation or deactivation signal from the bus bridge to power said system CPU based upon the power on command signal, a battery charger circuit and a battery for delivering power through the system DC/DC converter.

In another embodiment, the controller supplies the power on command signal directly to the system DC/DC converter.

In method form, the present invention provides a method to launch a selected application when power to a portable computer device is off or suspended, said method comprising the steps of selecting a desired application to launch;   generating a power on signal to a power supply; delivering power to a system CPU and a system bus bridge integrated circuit in response to the power on signal; and launching said selected application.

It will be appreciated by those skilled in the art that although the following Detailed Description will proceed with reference being made to preferred embodiments and methods of use, the present invention is not intended to be limited to these preferred

1   embodiments and methods of use. Rather, the present invention is of broad scope and is

2   intended to be limited as only set forth in the accompanying claims.

3   Other features and advantages of the present invention will become apparent as

4   the following Detailed Description proceeds, and upon reference to the Drawings,

5   wherein like numerals depict like parts, and wherein:

6   **Brief Description of the Drawings**

7   Figure 1 is a block diagram depiction of a portable computer system modified

8   with an application launch controller of the present invention;

9   Figure 2 is a flow chart of the preferred operation of the application launch

10   controller of Fig. 1;

11   Figure 3 is a block diagram depicting another embodiment of a portable computer

12   modified with an application launch controller of the present invention; and

13   Figure 4 is a flow chart of the preferred operation of the application launch

14   controller of Fig. 3.

15   Detailed Description of the Preferred Embodiments

16   Fig. 1 depicts a system block diagram 10 of a computer subsystem 12 modified

17   with an application controller 14 of the present invention. As an overview, the

18   application controller 14 permits users to launch applications using a set of predefined

19   function keys when power to the computer subsystem 12 is off or in a suspended state.

20   The computer subsystem 12 generally includes all conventional data processing

21   components such as a CPU 16 random access memory (not shown) together with various

22   ICs described in greater detail below. The computer subsystem 12 includes associated

23   input/output busses (e.g., PCI bus, ISA bus, IDE bus and SMBus) for interconnecting

24   various subsystems included within the system 10. CPU 16 interfaces with other

25   subsystems (not shown) through a system controller IC 18, depicted as "north bridge".

26   This is a conventional IC known in the art, and may be implemented, for example, using

27   Intel 822440BX chip set. A bus bridge IC 20 (depicted as "south bridge") interconnects

28   the PCI bus associated with the north bridge 18 with the ISA bus 22, the IDE bus 26, and

29   an SMBus 24. The bus bridge IC 20 may be implemented, for example, Intel 82371EB

1   chip set. The system also includes a system DC/DC converter 28 to couple power from a

2   battery 30 (and associated battery charger circuitry 32) to these various components

3   during normal operation, i.e., the system is on and the operating system (OS) is booted.

4   The application controller 14 of the present embodiment includes controller 34

5   operable to transmit an interrupt to the bus bridge 20 along the ISA bus 22 to activate or

6   deactivate the system DC/DC converter 28. Activation and deactivation, as described

7   herein is initiated by, for example, a wake interrupt and a suspend interrupt, respectively

8   generated by the bus bridge IC 20. The interrupt signal could also be communicated

9   along the SMBus.

10   The application launch controller 34 upon receipt of activation from one or more

11   of the function keys 36, in the present embodiment, generates an alert signal 40 to the

12   SMBus and an interrupt signal 42 to the bus bridge IC 20. The alert signal 40 is

13   generated to activate the battery charger circuit 32 and the battery 30, both of which are

14   coupled to and controlled through the SMBus 24, as is understood in the art. As

15   mentioned above, the interrupt signal 24 is sent to the bus bridge IC 20 to initiate the

16   DC/DC converter. In the preferred embodiment, the function keys 36 comprise one or

17   more dedicated buttons that are activated by the user. Moreover, function keys 36

18   preferably comprise a programmable set of buttons that are tied to one or more

19   application programs stored within the system. For example, a function key can be

20   programmed so as to launch the user's email program (for example, Microsoft Outlook®).

21   To conserve battery consumption while still permitting users to obtain the

22   information desired upon pressing a function key, the application launch controller 34

23   can also include an LCD display 38 displays information related to the task generated by

24   the application, and preferably takes the place of the conventional system display. To

25   that end, application launch controller 34 can be adapted with an interrupt signal that may

26   be sent to the system graphics display port (not shown) via north bridge IC 18 to hold the

27   main display in an off-state for certain application programs. For example, a function

28   key 36 may be preprogrammed to launch the user's email program and application launch

1   controller 34 can be programmed to display the total number of new emails only on the

2   LCD display 38.

3   Turning to Fig. 2, a flow chart 50 of the embodiment of Fig. 1 is depicted. If the

4   system is in an off or suspended state 52, and no function key is pressed, the system will

5   remain inactive. If a function key is pressed while the system is in the off or suspended

6   state, an interrupt signal is generated to the south bridge 54. The south bridge, in turn,

7   generates a wake signal or an activate signal to the DC/DC converter 56. Once the

8   system DC/DC converter is activated, the DC/DC converter generates the appropriate

9   commands to the charging circuitry and/or the battery to turn power on to the system 58.

10   The system then boots, as normal. Once booted, the buffer memory of the application

11   launch controller is poled to determine the specific application to launch 60. That

12   application is then launched 62, and further the specific task that may be required by the

13   user is performed 64. As noted above, it may be desirable to not power the system

14   display, but rather display results of the task performed on an LCD 66. After the task has

15   been performed, the application launch controller generates an off or suspend signal to

16   the south bridge IC and to the system DC/DC converter 68. Autonomously, the system

17   and the operating system power down 70 and are placed in the off or suspended state.

18   Fig. 3 depicts a system 10' adapted with an application launch controller 14' of a

19   second embodiment of the present invention. This embodiment differs from the

20   embodiment of Fig. 1 in that instead of generating interrupt signals to and through the

21   south bridge IC 20, the application launch controller 34' of this embodiment generates a

22   control signal 44 directly to the system DC/DC converter 28. In this embodiment, the

23   system DC/DC converter 28 is assumed to be adapt with the ability to externally control

24   its activation using, for example, signal 44 generated by application launch controller 34'.

25   The components of the computer subsystem 12 and application launch controller 14' of

26   this embodiment operate in a manner as described above with reference to Fig. 1.

27   Fig. 4 is a flow chart 80 of the embodiment of Fig. 3. If the system is in an off or

28   suspend state, and no function key is pressed, the system remains in this state 82. Upon

29   activation of a function key, the application launch controller generated a control signal

1   to wake or initiate the system DC/DC converter 84, instead of generating an interrupt

2   signal to the south bridge IC as described in the first embodiment. Activation of the

3   system DC/DC converter in turn activates the battery and/or charger circuitry to turn

4   power on to the system 86. Upon system boot up, the application launch controller polls

5   the buffer memory of the controller to determine which application to launch 88. That

6   application is launch 90 and the specific task required by the user is performed 92. If

7   appropriate, the results of which can be displayed on an LCD 94. Once the task has been

8   performed, the application launch controller generates an off or suspend signal to the

9   system DC/DC converter 96. Accordingly, this operates to power down the system and

10 the operating system 98 and replace the system into an off or suspended state.

11   In the embodiments of Figs. 1 and 3, the application launch controller 34 and 34'

12 are appropriately adapted with one or more bus interfaces to exchange commands and

13 data along the system ISA bus 22 and/or SMBus 24. Of course, those skilled in the art

14 will recognize that other bus technologies and may be developed, and the application

15 launch controller may be appropriately adapted with an interface to exchange commands

16 and data along other types of busses.

17   Thus, it is evident that there has been provided an application launch controller in

18 accordance with the aims and objectives stated herein. Those skilled in the art will

19 recognize numerous adaptations and modifications for the present invention, all of which

20 are deemed within the spirit and scope of the present invention, only as limited by the

21 appended claims.

22

1   <u>CLAIMS</u>

2   1.   A computer system adapted to launch application when the computer system is in

3   an off or suspended state, said computer system comprising:

4   a computer subsystem comprising a system CPU, coupled to a bus bridge

5   integrated circuit for coupling said CPU to a plurality of bus systems, and a power

6   supply; and

7   an application launch controller for launching a selected application when said

8   computer subsystem is in an off or suspended state comprising one or more bus interfaces

9   for exchanging commands and data along one or more of said bus systems and for

10 selectively generating a power on command signal to said power supply to deliver power

11 and turn on said computer subsystem and launch said selected application.

12 2.   A computer system as claimed in claim 1, wherein said system power supply

13 comprises a system DC/DC converter coupled to said bus bridge and receiving an

14 activation or deactivation signal from said bus bridge to power said system CPU based

15 upon said power on command signal, a battery charger circuit and a battery for delivering

16 power through said system DC/DC converter.

17 3.   A computer system as claimed in claim 1, wherein said bus systems comprise an

18 ISA bus and an SMBus.

19 4.   A computer system as claimed in claim 1, further comprising user activated

20 function keys generating a command signal to said application launch controller to launch

21 a specified application.

22 5.   A computer system as claimed in claim 1, further comprising an LCD display

23 coupled to said application launch controller for displaying task information related to

24 said selected application.

25 6.   A computer system as claimed in claim 1, wherein said bus systems comprise an

26 ISA bus and an SMBus, and wherein said application launch controller generating an

27 interrupt signal along said ISA bus to said bus bridge integrated circuit and an SMBus

28 alert signal to said SMBus, and said bus bridge integrated circuit generating said power

1   on command to said power supply in response to said interrupt signal from said

2   application launch controller.

3   7.   A computer system as claimed in claim 1, wherein said application launch

4   controller further generating a power off command signal to said power supply system

5   after a task associated with said selected application is completed.

6   8.   A computer system as claimed in claim 1, wherein said application launch

7   controller generating said power on command signal directly to said power supply

8   system.

9   9.   A method to launch a selected application when power to a portable computer

10   device is off or suspended, said method comprising the steps of:

11   selecting a desired application to launch;

12   generating a power on signal to a power supply;

13   delivering power to a system CPU and a system bus bridge integrated circuit in

14   response to said power on signal; and

15   launching said selected application.

16   10.   A method as claimed in claim 9, further comprising the step of generating an

17   interrupt signal to said bus bridge integrated circuit and in response thereto generating a

18   wake signal to said power supply.

19   11.   A method as claimed in claim 9, further comprising the step of displaying

20   information related to said selected application.

21   12.   A method as claimed in claim 9, wherein said step of selecting said application

22   comprises the step of depressing a programmable function key to generate said power on
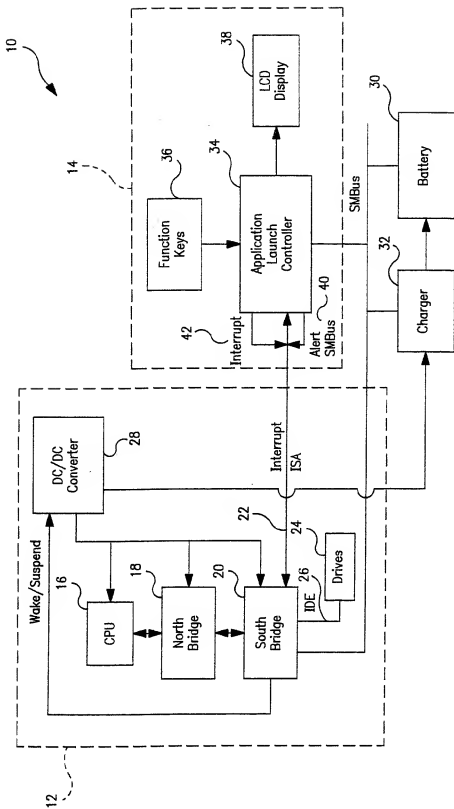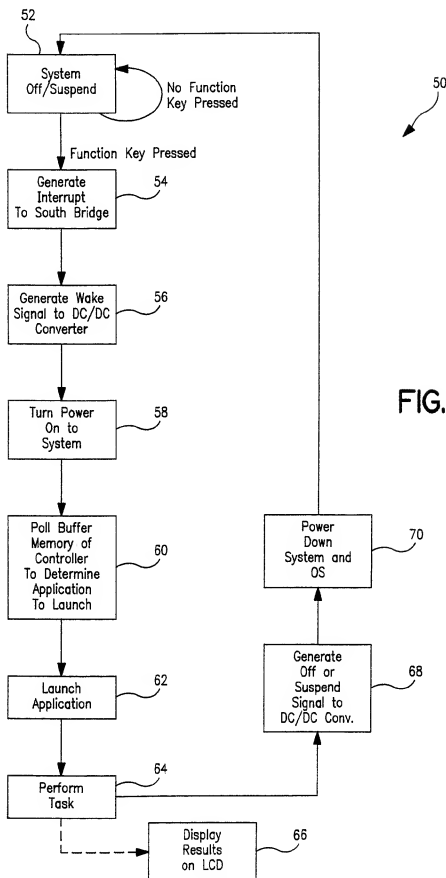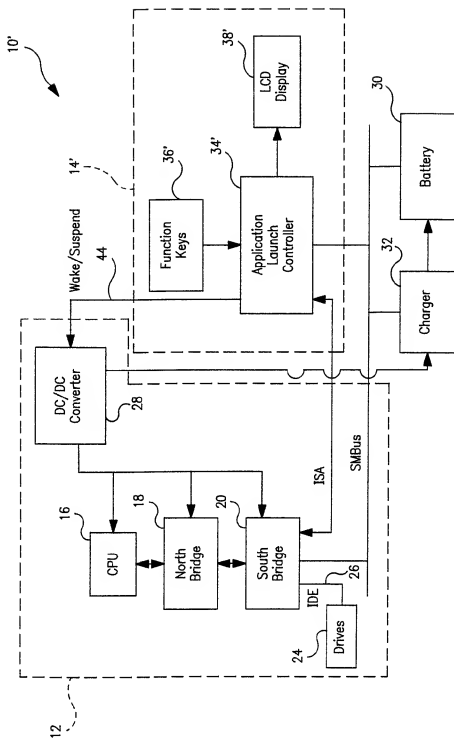
23   signal.

24

1 / 4

FIG. 1

FIG. 2

FIG. 3

FIG. 4

```
      82
      │
 ┌──────────────┐
 │   System     │◄──┐  No Function
 │ Off/Suspend  │   │  Key Pressed
 └──────────────┘───┘
      │
      │ Function Key Pressed
      ▼
 ┌──────────────┐
 │ Generate Wake│   84
 │Signal to DC/DC│
 │  Converter   │
 └──────────────┘
      │
      ▼
 ┌──────────────┐
 │  Turn Power  │   86
 │   On to      │
 │   System     │
 └──────────────┘
      │
      ▼
 ┌──────────────┐         ┌──────────────┐
 │ Poll Buffer  │         │    Power     │
 │  Memory of   │         │    Down      │   98
 │  Controller  │   88    │  System and  │
 │ To Determine │         │     OS       │
 │ Application  │         └──────────────┘
 │  To Launch   │                ▲
 └──────────────┘                │
      │                          │
      ▼                   ┌──────────────┐
 ┌──────────────┐         │   Generate   │
 │    Launch    │   90    │    Off or    │   96
 │ Application  │         │   Suspend    │
 └──────────────┘         │  Signal to   │
      │                   │  DC/DC Conv. │
      ▼                   └──────────────┘
 ┌──────────────┐   92           ▲
 │   Perform    │                │
 │    Task      │────────────────┘
 └──────────────┘
      ┊
      ▼
 ┌──────────────┐
 │   Display    │   94
 │   Results    │
 │   on LCD     │
 └──────────────┘
```
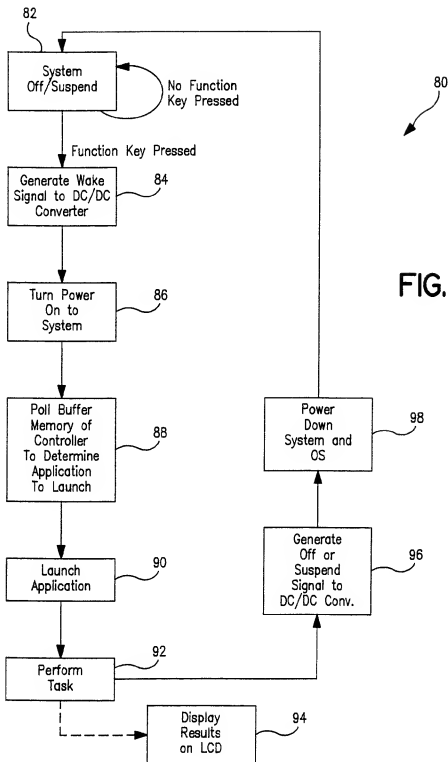
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/23103

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G11B 17/22
US CL : 713/300

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 713/300, 324, 340; 710/100, 102, 103, 129

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,910,933 A (MOORE et al.) 08 June 1999, Abstract; col. 3 thru 10	1-12
Y	US 5,548,777 A (WOO) 20 August 1996, col. 3 thru col. 10	1-12
Y	US 5,796,705 A (KIM) 18 August 1998, col. 3 thru col. 10	1-12
Y	US 5,870,355 A (FUJIHARA) 09 February 1999, col. 9 thru col. 22	1-12
Y	US 5,671,368 A (CHAN et al.) 23 September 1997, col. 3 thru col. 12	1-12
Y,E	US 6,125,417 A (BAILIS et al.) 26 September 2000, col. 3 thru col. 10	1-12

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:
"A"	document defining the general state of the art which is not considered to be of particular relevance
"E"	earlier document published on or after the international filing date
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O"	document referring to an oral disclosure, use, exhibition or other means
"P"	document published prior to the international filing date but later than the priority date claimed

"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 NOVEMBER 2000	04 JAN 2001

Name and mailing address of the ISA/US	Authorized officer
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Form PCT/ISA/210 (second sheet) (July 1998)*

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	US 5,903,764 A (SHYR et al.) 11 May 1999, col. 6 thru col. 26	1-12
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